Geographic Information Systems
Master Plan

FY 2001 - 2002

Cooperatively Developed By

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&
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Acknowledgements

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GIS Users Group

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Mission Statement

The GIS Division shall serve as the coordinating body for mapping and data development for departments within the City of Salisbury. The GIS Division shall be committed to the development of accurate and timely data about the City of Salisbury and the surrounding region. Each department shall utilize GIS data as applicable in order to provide a continuing level of service to the citizens of Salisbury. The GIS Division shall be a central point of contact for citizens to quickly and easily access accurate and current geographic information.

Introduction

The development of a Geographic Information System (GIS) Master Plan is a long and detailed process. As such, the *Local Government GIS Development Guide* has served as a valuable resource in organizing this initial GIS Master Plan for the City of Salisbury. This plan shall set forth the procedures and methods used for planning the GIS, evaluating potential data sources and data needs, evaluating hardware and software solutions, building the GIS data base, developing GIS applications, and planning for the long term maintenance of the GIS system and the data.

The underlying philosophy of this entire Master Plan is to concentrate on the GIS data. The importance of data is commonly overlooked, despite being both the most expensive and the most integral part of an enterprise GIS. Data must be collected, stored, maintained and archived in such a manner as to ensure continued availability and utility to users of the enterprise GIS.

Basic Definition of a Geographic Information System (GIS)

According to ESRI, a geographic information system (GIS) is defined as an organized collection of computer hardware, software, geographic data, and personnel. This system is designed to efficiently capture, store, update, manipulate, analyze, and display the geographically referenced information.

A GIS is <u>not</u> maps, but it is...

- A method of organizing data

- Geographic data (maps, images, drawings, etc.)

- Descriptive data (databases)

- A method of distributing data

- A method of analyzing data

- A method of visualizing data

The value of a GIS is found after the development of large amounts of data. Unlike other software applications, where a user can begin to utilize it immediately upon installation, a GIS requires that extensive databases be available before it becomes useful.
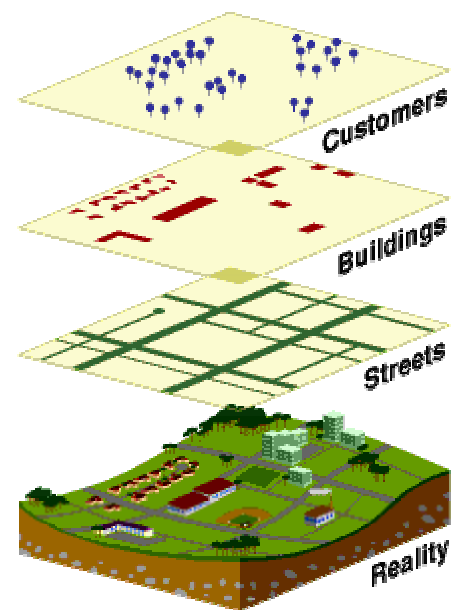
GIS is comprised of five key elements: hardware, software, data, people and methods.

Hardware is the computer on which a GIS operates. Peripheral equipment such as plotters, printers, scanners and digitizers are often a large component of the GIS.

GIS software provides the functions and tools needed to create, manipulate, analyze, manage, display and output geographic data.

Data is the key component of a GIS. Data can be collected and created in-house, or purchased from a commercial data provider. Some examples of data are: Roads, Parcels, Municipal Boundaries, School Districts, Census Tracts, Parks, Water Bodies, Landmarks, Historic Places, Bus Routes, Rail Lines, Major Employers, Schools, Wetlands, Demographics, Incidences of Disease/Illness, Traffic Counts, Libraries, Watersheds, Hazardous Material Locations, Geologic data, etc.

People manage the system and develop plans to apply it to real world problems. GIS users range from technical specialists who design and maintain the system, to those who use it to help them perform their everyday work.

A successful GIS needs well-designed methods to function efficiently. (whether it be collecting and maintaining data on a timely basis, or automating analysis done on a regular basis).

More on "What is Geographic Information System?"...

"A geographic information system is a facility for preparing, presenting, and interpreting facts that pertain to the surface of the earth. This is a broad definition . . . a considerably narrower definition, however, is more often employed. In common parlance, a geographic information system or GIS is a configuration of computer hardware and software specifically designed for the acquisition, maintenance, and use of cartographic data." C. Dana Tomlin - **Geographic Information Systems and Cartographic Modeling** (Englewood Cliffs, NJ: Prentice-Hall,1990), page xi

"A geographic information system (GIS) is an information system that is designed to work with data referenced by spatial or geographic coordinates. In other words, a GIS is both a database system with specific capabilities for spatially-referenced data, as well [as] a set of operations for working with data . . . In a sense, a GIS may be thought of as a higher-order map." Jeffrey Star and John Estes - **Geographic Information Systems: An Introduction** (Englewood Cliffs, NJ: Prentice-Hall, 1990), page 2-3

A GIS is "an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information." - **Understanding GIS: The ARC/INFO Method** (Redlands, CA: Environmental System Research Institute, 1990), page 1.2

"GIS is a special-purpose digital database in which a common spatial coordinate system is the primary means of reference. Comprehensive GIS require a means of:

- Data input, from maps, aerial photos, satellites, surveys, and other sources

- Data storage, retrieval, and query

- Data transformation, analysis, and modeling, including spatial statistics

- Data reporting, such as maps, reports, and plans

Three observations should be made about this definition:

First, GIS are related to other database applications, but with an important difference. All information in a GIS is linked to a spatial reference. Other databases may contain locational information (such as street addresses, or zip codes), but a GIS database uses geo-references as the primary means of storing and accessing information.

Second, GIS integrates technology. Whereas other technologies might be used only to analyze aerial photographs and satellite images, to create statistical models, or to draft maps, these capabilities are all offered together within a comprehensive GIS.

Third, GIS, with its array of functions, should be viewed as a process rather than as merely software or hardware. GIS are for making decisions. The way in which data is entered, stored, and analyzed within a GIS must mirror the way information will be used for a specific research or decision-making task. To see GIS as merely a software or hardware system is to miss the crucial role it can play in a comprehensive decision-making process." - Kenneth E. Foote and Margaret Lynch, The Geographer's Craft Project, Department of Geography, University of Texas at Austin

What Do Governments Do with GIS?

The use of geographic information systems by local government falls into five major categories:

- Browse

- Simple display (automated mapping)

- Query and display

- Map analysis

- Spatial modeling.

Browse

This function is equivalent to the human act of reading a map to find particular features or patterns. Browsing usually leads to identification of items of interest and subsequent retrieval and manipulation by manual means. For single maps, or relatively small areas, the human brain is very efficient at browsing. However, as data volumes increase, automated methods are required to effectively extract and use information from the map.

Simple Display

This GIS function is the generation of a map or diagram by computer. Such maps and diagrams are often simple reproduction of the same maps used in a previous manual oriented GIS environment. Examples of this type of use are preparation of a 1:1000-scale town map, a sketch of an approved site plan, maps of census data, etc.

Query And Display

This function supports the posing of specific questions to a geographic database, with the selection criteria usually being geographic in nature. A typical simple query would be: "draw a map of the location of all new residential units built during 1989." A more complex query might be: "draw a map of all areas within the town where actual new residential units built in 1989 exceeds growth predictions." Such a query could be part of a growth management activity within the town.

Queries may be in the form of regular, often asked questions or may be ad hoc, specific purpose questions. The ability to respond to a variety of questions is one of the most useful features of a GIS in its early stages of operation. In the long run, other more sophisticated applications of the GIS may have a higher value or benefit, but to achieve these types of benefits, users must be familiar with the GIS and its capabilities. Such familiarization is achieved through the use of a GIS for the simpler tasks of query and display.

Map Analysis (Map Overlay)

This involves using the analytical capabilities of GIS to define relationships between layers of spatial data. Map analysis is the super-imposition of one map upon another to determine the characteristics of a particular site (e.g., combining a land use map with a map of flood prone areas to show potential residential areas at risk for flooding).

Map analysis (often termed overlay or topological overlay) was one of the first real uses of GIS. Many government organizations, particularly those managing natural resources, have a need to combine data from different maps (vegetation, land use, soils, geology, ground water, etc.). The overlay function was developed to accomplish the super-imposition of maps in a computer.

The data are represented as polygons, or areas, in the GIS data base, with each type of data recorded on a separate "layer." The combination of layers is done by calculating the logical intersection of polygons on two or more map layers.

In addition to combining multiple "layers" of polygon-type data, the map overlay function also permits the combination of point data with area data (point-in-polygon). This capability would be very useful in a town for combining street addresses (from the Assessor's files) with other data such as parcel outlines, census tract, environmental areas, etc. Many facility siting problems, location decisions, and land evaluation studies have successfully used this procedure in the past.

Spatial Modeling

This application is the use of spatial models or other numerical analysis methods to calculate a value of interest. The calculation of flow in a sewer system is an example of spatial modeling. Spatial modeling is the most demanding use of a GIS and provides the greatest benefit. Most spatial modeling tasks are very difficult to perform by hand and are not usually done unless a computerized system, such as a GIS, is available. These models allow engineers and planners to evaluate alternate solutions to problems by asking "what if" type questions.

A spatial model can predict the result expected from a decision or set of decisions. The quality of the result is only as good as the model, but the ability to test solutions before decisions have to be made usually provides very useful information to decision makers. Once again, this type of use of a GIS will evolve over time, as the GIS is implemented and used.

In general, geographic information in local government is used to:

- Respond to public inquiries,

- Perform routine operations such as application reviews and permit approvals, and

- Provide information on the larger policy issues requiring action by the town board.

These are typical local government activities which benefit from a geographic information system. The development of GIS will facilitate the present geographic information handling tasks and should lead to the development of additional applications of benefit to the local government.

Excerpted from Geographic Information System Development Guides - Needs Assessment New York State Archives and Records Administration.

What is the Relationship between CAD and GIS?

Computer Aided Design (CAD)

A closely related computer capability is a CAD system (computer aided design). CAD systems are used to prepare detailed drawings and plans for engineering and planning applications. While CAD systems functions are different from GIS functions, many commercial CAD products have some of the functionality normally found in a GIS. There are, however, significant differences between a CAD system and a GIS, mainly in the structure of the database. There may be some need for CAD-type capabilities in a particular local government, so this forms another category of use.

At the 1998 Autodesk Design World, Bill Wittreich of Wittreich & Associates, gave a presentation titled **Beyond CAD into GIS**. What follows is paraphrased from a portion of his talk.

AutoCAD Map adds GIS features to the base AutoCAD product and, as such, these features help define the difference between CAD and GIS. In short, the difference between CAD and GIS is the difference between a drawing and a spatial database.

Modeling

CAD models things in the real world. GIS models the world itself. Therefore, GIS uses geographic coordinates systems and world map projections while CAD coordinates are relative to the object being modeled and are not usually relative to any particular place on earth.

Objects

CAD objects include lines, circles, arcs, text, etc. using layers, blocks, internal data, and dimensions. CAD objects don't know about each other, even though they may touch or overlap. GIS objects know about each other:

- GIS understands networks. For instance, the lines describing streets are related to one another.

- GIS understands enclosed areas (polygons) and their associativity with other objects.

- GIS understands connectivity, conductivity, and associativity which enables spatial analysis.

- GIS adds topology

The primary difference between CAD and GIS is topology. GIS has it, CAD doesn't. In a CAD environment, the objects (lines, polylines, points, etc.) have no relationships between them. Topology brings these objects together into logical groups to form real world models.

Node topology allows spatial analysis, such as buffering to determine other objects within a certain range.

Network topology allows modeling of direction and resistance. Path tracing finds the fastest or best route. Flood tracing determines the maximum flow from a given point and network resistance. As with node topology, buffer analysis can be applied to networks too.

Polygon topology enables polygons to have relationships. Polygons also have centroids which can be used to hold data relevant to the polygons. Polygon spatial analysis includes overlay analysis such as determining parcels in a floodplain. Polygons can be "dissolved" using attributes with common values to remove interior lines, in effect aggregating polygons with in the same class.

Topology and spatial analysis differentiate GIS from CAD.

Data Management

GIS separates object storage from object display, combining data from multiple sources into a virtual data warehouse. That data can then be used in any number of separately defined analyses or presentations. CAD systems carry baggage such as line color, line width, etc. that is not relevant to the data itself.

GIS systems are usually disk-based and can model larger areas than CAD implementations which are usually memory-based. For instance, CAD files are typically smaller, such as product designs as compared to regional, state, or even world models in GIS.

The Trend

While the distinction between CAD and GIS is gray now, as features are added to CAD systems, the distinction will blur even more.

Seven Keys that Guarantee the Success of Your GIS

1. **Master Plan**

    ✓ A vital "first-step" for local, state, and federal agencies.
    ✓ Learn how to jump-start your existing GIS initiative.
    ✓ Learn how to share the plan to guarantee organization-wide support.
    ✓ Identify optimal uses of GPS and web-based tools.
    ✓ Identify funding opportunities.

2. **Coordination**

    ✓ The most critical key to success!
    ✓ Identify the best solution for coordinating your GIS.
    ✓ Organize your GIS efforts to serve all departments.
    ✓ Identify where to locate the coordination effort.
    ✓ What are the characteristics of an effective coordination strategy?

3. **Quick Success**

    ✓ The first year will determine the success of your project.
    ✓ Guarantee support from managers, directors, and elected officials.
    ✓ Identify and target "high impact" projects.
    ✓ How to "showcase" your successes!
    ✓ Leverage press and media coverage.
    ✓ Show successes and progress continually.

4. **Educate**

    ✓ How to best educate your entire organization?
    ✓ Guarantee support throughout your organization.
    ✓ How to make GIS indispensable for your agency.
    ✓ Outsourcing vs. in-house education.
    ✓ Select the best tools i.e. newsletters, user groups, and conferences.

5. **Easy to Use**

    ✓ How to deliver the right tools to the right person!
    ✓ Remove obstacles to GIS use.
    ✓ Task-specific solutions.
    ✓ How to make GIS useful and easy to use.
    ✓ New GIS tools to ensure enterprise-wide use.
    ✓ GIS applications with little training.

6. Enterprise Wide

- ✓ Enterprise-wide usage – the litmus test for a truly successful GIS.
- ✓ As widely used as a word processor.
- ✓ GIS on everyone's desktop!
- ✓ Users in all departments.
- ✓ How to harness the power of GIS.
- ✓ How to turn raw data into meaningful information.

7. Benefits vs. Costs

- ✓ Quantify the benefits of GIS.
- ✓ Show how your GIS saves lives, time, and money!
- ✓ Guarantee continued support from organization leaders and elected officials.
- ✓ Identify revenue-generating options.
- ✓ Real world examples.

From Curtis Hinton, Geographic Technologies Group, Inc.

Hardware

The City of Salisbury is fortunate to have a policy of replacing computers every three years.

This enables staff to work quickly and efficiently on up-to-date machines. The Information

Technology Division of the Finance Department has also recognized that computers utilized for

GIS purposes typically need more memory, a better video card, and a larger monitor. The

specifications for a GIS computer for fiscal year 2001-2002 are as follows:

Hard Drive:	Western Digital 20GB 7200 RPM
Memory:	512 MB (PC133 SDRAM)
Monitor:	OptiQuest 21 inch 1600 x 1280
Operating System:	Windows 2000 Professional
Processor:	AMD Athlon 1GHZ 266 Front Side Bus
Video Card:	ATI 64MB Radeon Double Data Rate AGP

Software

The City of Salisbury has standardized on the Environmental Systems Research Institute, Inc. (ESRI) family of products for its geographic information systems software. ArcInfo and ArcIMS are on a yearly maintenance contract. Upgrades for ArcView are purchased on an as-needed basis. The following number of licenses is held by the City of Salisbury:

Software Name	Number of Licenses	Renewal Date
ArcInfo	4	09-11-2002
ArcPress	1	09-11-2002
COGO	2	09-11-2002
Network	2	09-11-2002
Spatial Analyst	2	09-11-2002
ArcIMS	2	09-11-2002
ArcView	33	Last upgraded 07-16-2001
	(13 for training purposes)	
Network	2	Need to be upgraded
Spatial Analyst	2	Need to be upgraded

The City of Salisbury has standardized on the AutoDesk, Inc. family of products for its computer-aided drafting software. All AutoDesk products are on a yearly subscription service. The following number of licenses is held by the City of Salisbury:

Software Name	Number of Licenses	Renewal Date
Land Development Desktop	9	10-31-2002
CAD Overlay	8	10-31-2002
Civil Design	8	10-31-2002
Survey	8	10-31-2002
AutoCAD	2	10-31-2002

All departments/divisions using geographic information systems or computer-aided drafting software are requested to coordinate their purchases through the GIS Division.

Development Services
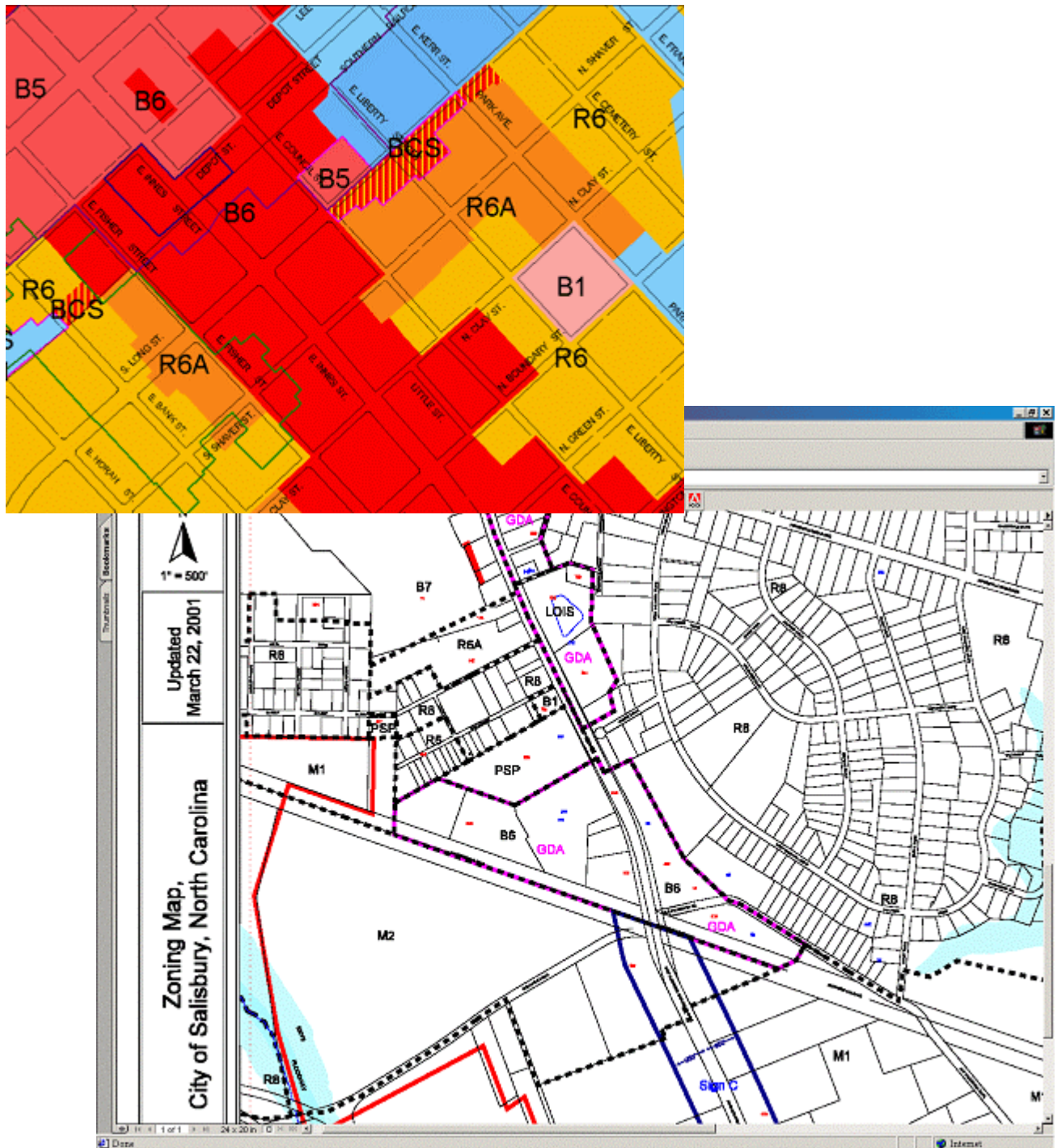
Purpose

To provide citizens, builders and developers a centralized source of information, permit services, code enforcement, zoning and special district boards support through a Development Services Center.

GIS Uses

The Development Services Division of the Land Management & Development Department provides citizens, builders, and developers a centralized source of information for permits services, code enforcement, zoning, and special district boards. This division is responsible for issuing permits for certificates of appropriateness, certificates of occupancy, driveways, new construction, sewer connections, signs, water connections, and Zoning Board of Adjustment applications.

With a commitment to accurate information about the above-mentioned services, this division could benefit greatly from a GIS system integrated into their existing databases. Although some revisions to existing database structure may have to be made, this integration of GIS would enhance existing tabular data by giving it a spatial component. The majority of the information related to the issuance of such permits is geographic in nature – providing a map element as well as tabular data for staff to use as well as for the public to see would be a great benefit.

As data is entered regarding new permits, staff would be empowered with the ability to provide a geographic representation of residential and commercial growth, development, and

reinvestment trends throughout the City. Monthly reports to the North Carolina Department of

Labor regarding private building permits issued could be completed efficiently as well. Another

benefit would be recognized in completion of paperwork regarding the decennial census – new

construction, demolitions, etc. could easily be identified and submitted to the US Census

Bureau.

Data Development

An efficient permitting process based upon GIS data must have timely and accurate data as its

base. The following data layers have been identified as necessary for use by Development

Services:

Layer Name	Use	Status
Addresses	Tie City-assigned addresses to County tax map and parcel numbers	In progress
Billboards	Identify locations of compliant/non-compliant billboards	Complete (in CAD)
City ETJ boundary	Identify properties within City ETJ	Complete
City limit boundary	Identify properties within City limits; reference	Complete
Historic district boundaries	Identify properties within local and national historic districts	Complete
Institutions	Reference	Complete (in CAD)
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Parks	Reference	Complete
Redevelopment Areas	Identify properties within targeted redevelopment areas	Not started
Signs	Identify locations of compliant/non-compliant signs, complete with pictures	Not started
Streets	Address matching	Currently use County file; see Engineering for City file status

Subdivisions	Identify properties according to subdivision location; reference	Not started
Townships	Identify properties according to township location; reference	Not started
Zoning	Identify zoning for properties	Complete

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Maintain an accurate database/data layer of addresses by tax map and parcel number for address assignments by the City.

3. Revise existing database(s) for zoning permits in order to...

   - Provide a web-based application for data input/permit printing

   - Standardize addresses for geocoding

   - Generate monthly *Report of Private Building Permits Issued* as required by the North Carolina Department of Labor

4. Geocode zoning permit data in order to provide data quickly and easily through web-based application.

Engineering Division

Purpose

To provide a centralized source of general engineering services for the City including surveying, design work, review and approval of final plans submitted by outside consultants, site inspections and coordination of project activities initiated between the City and other agencies.

GIS Uses

The Engineering Division of the Land Management & Development Department provides mapping for a number of data layers utilized throughout the City – street centerline, city limits, and floodway. The street centerline is maintained in order to generate the annual Powell Bill Report and for other issues regarding maintenance responsibility for streets within the City limits. Floodway data is used for determinations of flood zones for use with the National Flood Insurance Program of which Salisbury is a member. Staff has indicated a desire to be able to utilize County parcel data in coordination with the data layers above to produce listings for address in flood prone areas, within certain areas of the City.

The Engineering Division maintains its information utilizing AutoCAD Land Development Desktop. While this product has the "look" and "feel" of GIS because of its functionality within AutoCAD Map, it is not a true GIS system. Thus, the information that is generated by Engineering is not as easily shared among users throughout the City. The GIS Division has approached this situation with several options in mind…

1) Continue to convert/export data to a native GIS format

2) Convert existing CAD data to a native GIS format, preferably ArcInfo

3) Implement ArcSDE as a data storage solution with a CAD Client interface

Only selected CAD data sets are currently being considered for conversion to a native GIS format and/or sharing through ArcSDE.

Data Development

The following data layers have been identified as necessary for use by Engineering:

Layer Name	Use	Status
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Floodway	Identify properties within flood-prone areas	Complete; digitized from FEMA maps
Impervious surfaces	Include locations of sidewalks, parking areas, etc.	Not started
Institutions	Reference	Complete (in CAD)
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Parking areas	Indicate location and type of parking areas	Not started
Parks	Reference	Complete
Pedestrian access	Include locations of sidewalks, pedestrian crosswalks, wheelchair curb cuts, etc.	Not started
Streets	Address matching; Powell Bill report	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Subdivisions	Indicate locations of named subdivisions; reference	Not started
Topography	Planning purposes; reference (2 ft contours)	Complete (based on 1987 flight)
Traffic volumes	Indicate volume of traffic at certain points along City streets	Currently received from NCDOT in paper format

Goals

1. Work with GIS Coordinator to determine when street centerline will be converted to ArcInfo format.

   - Identify other attribute data needed by other City departments

   - Easily share data and updates with County and other City departments

   - Complete block ranges for City streets

2. Develop data layers as identified in the ***Data Development*** section.

3. Develop a web-based application for the identification of flood prone areas available to the general public as well as other City departments.

4. Develop pedestrian access data layer(s) to include locations of sidewalks, pedestrian crosswalks, etc. Determine precision level prior to development of data to see if this information may also be used for impervious surface calculations.

5. Develop impervious surface data layer(s) for storm water runoff analysis purposes. May be able to utilize this information for an assessed impervious surface fee.

6. Aid in development of subdivision data layer.

Fire Department

Purpose

To provide capable, well trained personnel and necessary equipment to suppress fires and effectively manage Hazardous Chemical accidents that may occur in our community related to transportation or industry; to provide rescue services as needed and basic Life Support through an updated Fire Responder Program. To continue to work toward a more fire-safe community through Loss Prevention activities, including inspections, code enforcement, minimum housing activities and public education programs.

GIS Uses

The Salisbury Fire Department relies heavily on GIS software and data layers. GIS is essential to many aspects of operations, including response planning, annexation planning, resource planning, water supply development and maintenance, and hydrant management. Service areas have been developed using ESRI's Network Analyst. Also, fire incidents are address matched to indicate the location and distribution of fire incidents throughout the City. This information is also used in conjunction with orthophotography for post-incident critiques.

As additional data layers are developed, the department will be able to use GIS in many more ways. Specifically, building footprints will allow fire officials to visualize building layouts in the event of a critical incident. A new street centerline file is needed in order to consistently have updated information from all City departments.

Data Development

The following data layers have been identified as necessary for use by the Fire Department:

Layer Name	Use	Status
Abandoned structures	Indicate locations of abandoned, vacant, or structures not meeting minimum housing codes	Not started
Alternate water sources	Reference	Not started
Annexation areas	Indicate areas slated for annexation	In progress – some areas compiled in CAD
Building footprints	Reference	Not started
Building plans (commercial structures)	Helpful when fighting fires at large/multiple buildings; Reference	Not started
City limit boundary	Reference	Complete
Fire hydrants	Indicate location and other pertinent attributes about hydrants	Not started
Fire incidents (geocoded)	Research/analysis/reference	Not started
Fire station locations	Indicate locations of fire stations	Complete
Floodway	Identify properties within flood-prone areas	Complete; digitized from FEMA maps
Hazardous materials	Indicate locations where hazardous materials are stored	Not started
Inspected City businesses	Indicate locations of inspected City businesses; reference	Currently maintained in FireInfo by Doug Stevens
Institutions	Reference	Complete (in CAD)
Land use	Indicate classifications of land use on a parcel level basis	Completed as a part of 2020 Plan; requires updating.
Land use history	Indicate previous uses of land use on a parcel level basis	Not started
Minimum housing structures	Structures not meeting minimum housing standards; reference	Not started
OPTICOM intersections	Reference	Complete (in CAD)
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Photos of structures	Reference	Not started
Rowan County fire districts	Reference	Not yet acquired

Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Water lines	Indicate location of water service lines; reference	Not started

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Utilize street centerline, fire station locations, etc. to determine response times for fire stations by distance as well as by time. Further use this information for planning for increased staffing and/or new fire stations.

3. Purchase software or develop an application that enables Fire Department officials to print on demand City street atlas books for use in vehicles.

4. Develop a web-based application available to all fire personnel for ad hoc analysis of fire data.

5. Develop a scaled-down web-based application available to the public so that they can be better informed about fire incidents within the City of Salisbury.

Parks & Recreation Department
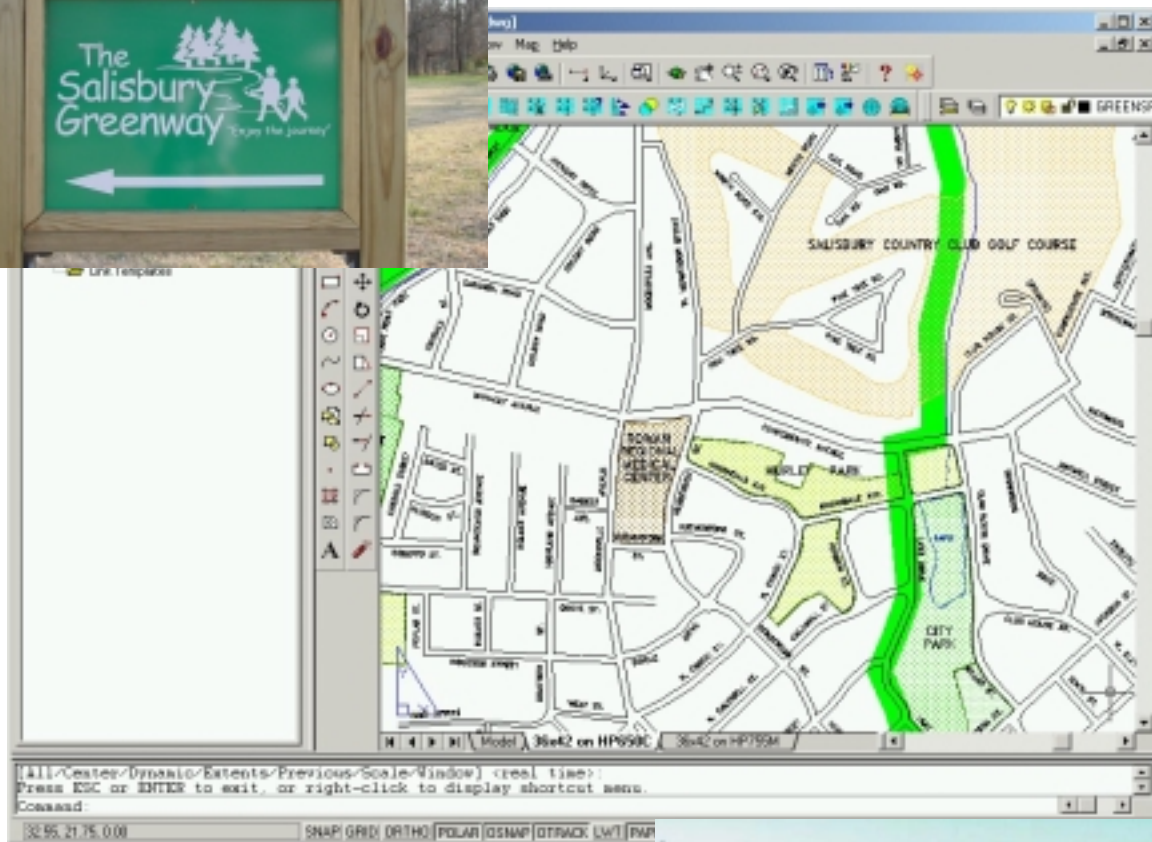
Purpose

To provide the citizens of Salisbury with a variety of leisure services and activities through a system of safe, attractive, maintained parks and diversified programs that meet the current and future needs of the community.

GIS Uses

Currently, a data layer of existing parks and amenities is maintained for the Parks and Recreation Department. This information is useful not only as a resource for the general public, but is also instrumental in the update of the Parks and Recreation Master Plan. A web-based application provides the general public with access to information about the location of parks and what amenities are offered at each. With the development of additional data, GIS could be used even more within Parks and Recreation:

1. A map could be maintained that indicates the location parks and recreation facilities throughout the City. Also, smaller area maps could be maintained for each park. These static maps could be made available for download to the general public.

2. Analysis could be run on the location of existing parks and recreation facilities to determine what portion of the City was being serviced. This information could then be used to plan additional parks/facilities and/or changes to existing parks/facilities to better serve the public.

Data Development

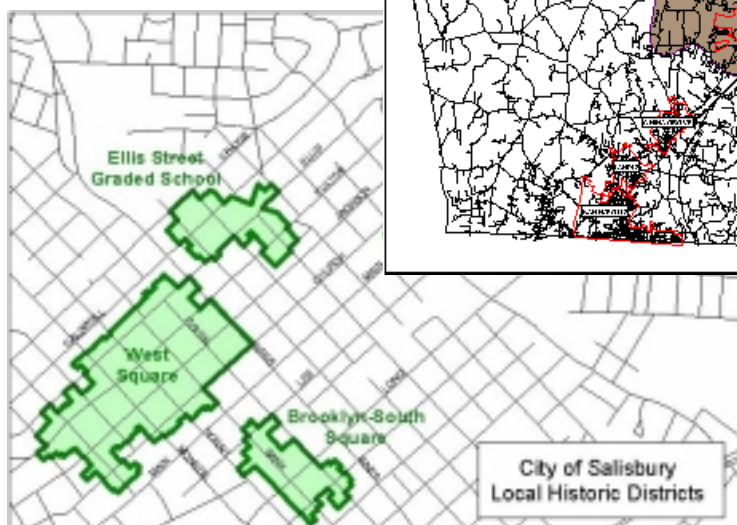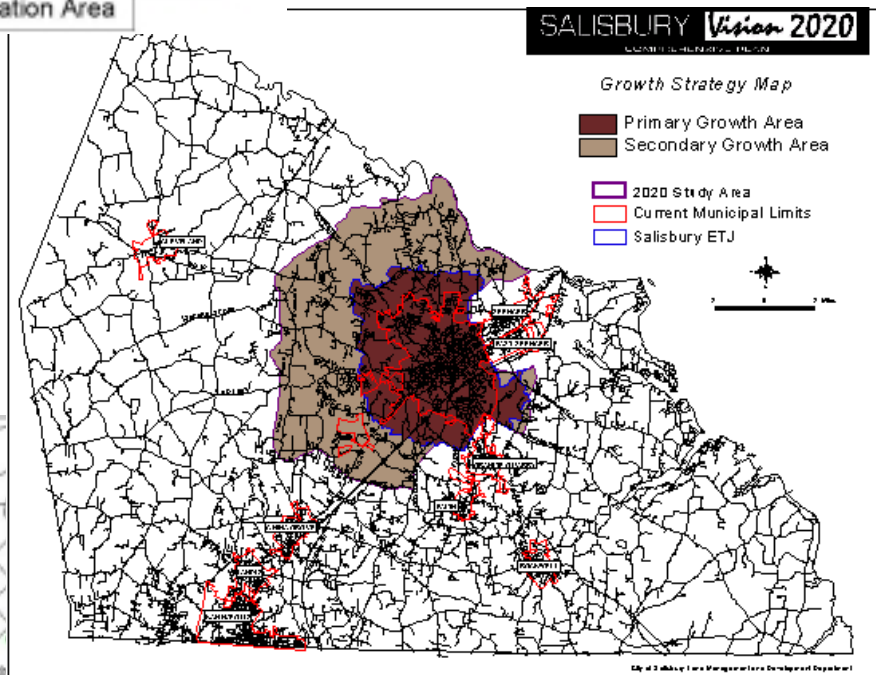The following data layers have been identified as necessary for use by Parks and Recreation:

Layer Name	Use	Status
Bicycle routes	Indicate designated bicycle routes	Complete in paper form; digital form not started
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Floodway	Identify properties within flood-prone areas	Complete; digitized from FEMA maps
Greenway	Indicate location of greenway and illustrate access to parks	Currently maintained in CAD
Institutions	Reference	Complete (in CAD)
Local landmarks	Reference	Not started
Parks	Reference	Complete
Private recreation sites	Reference	Not started
Schools	Indicate locations of schools (K-12), colleges, and universities	Complete (in CAD)
Streets	Address matching; reference	Currently use County file; see Engineering for City file status
Subdivisions	Reference	Not started
Topography	Planning purposes; reference (2 ft contours)	Complete (based on 1987 flight)

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Enhanced existing web-based application (parks and facilities inventory) available to the public for querying of amenities via park name, proximity to an address input by user, or type of amenity.

3. Tie existing web-based application (parks and facilities inventory) to programs offered. Make this available to the public for querying of programs via park name, proximity to an address input by user, or type of program.

4. Utilize demographic information, tax data, etc. in an effort to investigate options for building a new gymnasium and planning other future facilities.

5. Develop a web-based application focused specifically on the development of the Salisbury Greenway in order to raise awareness of the project and attract additional funding. Provide photos and other interesting items about the greenway and its amenities.

6. Develop a database of Parks and Recreation customers. Map these customers to determine where customers are coming from and what neighborhoods, communities, etc. are being served. Compare this information to general City demographics.

7. Utilize GIS data for updates to the Parks and Recreation Master Plan: census data, facilities locations, greenways, historical sites, land use, park locations, population projections, private recreation sites, recreation programs, school locations, topological and floodplain data, transportation thoroughfare plan, water and sewer inventories, etc.

Planning

Existing City Limits
Potential Annexation Area

SALISBURY *Vision 2020*

Growth Strategy Map

Primary Growth Area
Secondary Growth Area

2020 Study Area
Current Municipal Limits
Salisbury ETJ

Ellis Street
Graded School

West
Square

Brooklyn-South
Square

City of Salisbury
Local Historic Districts
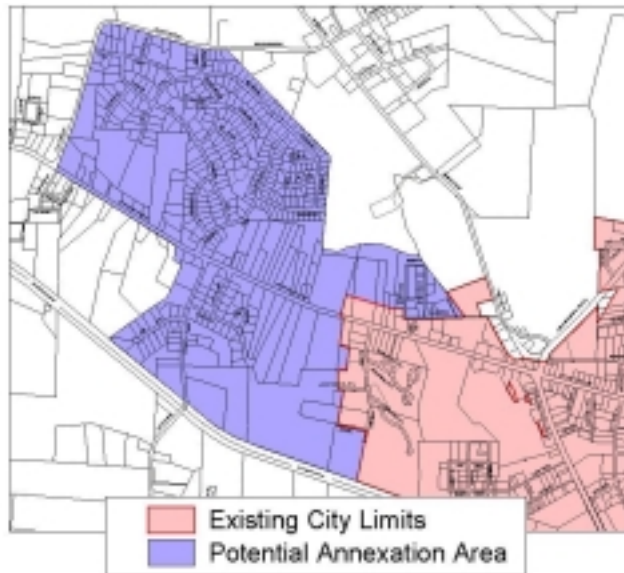
Purpose

To provide for a coordinated planning program to insure orderly growth within the City to include population, land use, thoroughfares, public facilities, neighborhoods, zoning, subdivision regulations, other specialty areas, and geographic information systems. To formulate, develop and recommend policies, plans and local ordinances intended to improve the overall appearance, economic climate within the City and its extraterritorial areas. To eliminate slums and blighted conditions in commercial and residential areas by code enforcement and provide for orderly growth and development within the City.

GIS Uses

The Planning Division relies heavily on existing GIS software and data in order to perform both its short-term and long-range planning functions. Staff attempts to incorporate data from various realms, such as utilities, floodplains, census data, and traffic information. As new data is developed, it is integrated into staff reports and presentations, enhancing the decision-making process as the City continues to grow and change.

The Planning Division uses GIS to produce a wide range of thematic maps for use within the Land Management Department, as well as custom mapping for other city departments, local agencies, and individuals. As the technology base increases, we can continue to expand this mapping element to be easily available to the public through the internet.

As additional data layers are developed, it will become easier to identify growth patterns and trends as they occur over time throughout the City. Parcel level data will improve many processes, including property owner notifications, land use analysis, and annexation studies.

This division could benefit greatly from geo-referenced permitting data from the Development Services Division, as well as enhanced and updated data from the Utilities Department.

Data Development

The following data layers have been identified as necessary for use by Planning:

Layer Name	Use	Status
Annexation areas	Indicate areas slated for annexation	In progress – some areas compiled in CAD
Architectural survey data	Reference	Complete in paper form; digital form not started
Building footprints	Reference	Not started
Certificate of Appropriateness database	Research/analysis/reference	Not started
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Floodway	Identify properties within flood-prone areas	Complete; digitized from FEMA maps
Growth corridors/target areas	Indicate areas desirable for growth/redevelopment by the City	Not started
Historic properties database	Research/analysis/reference	Started by intern in Spring 2001; need new intern
Institutions	Reference	Complete (in CAD)
Land use	Indicate classifications of land use on a parcel level basis.	Completed as a part of 2020 Plan; requires updating.
Neighborhoods	Indicate locations by common names; reference	Complete (developed separate from Police Department)
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Pedestrian access	Include locations of sidewalks, pedestrian crosswalks, etc.	Not started
Parks	Reference	Complete
Sewer lines	Indicate location of sewer service lines; reference	Not started
Sewer service areas	Indicate broad areas where sewer service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)

Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Subdivisions	Indicate locations of named subdivisions; reference	Not started
US Census Data	Data from Summary Tape Files 1 and 3.	STF1 not processed; STF3 not yet available
Water lines	Indicate location of water service lines; reference	Not started
Water service areas	Indicate broad areas where water service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)
Zoning	Indicate locations of zoning classifications throughout the City	Complete
Zoning case database	Research/analysis/reference	Not started

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Develop a web-based application for the querying of zoning information via classification, proximity to an address, and/or tax map and parcel number in put by user. Make this available to the general public as well as other City departments.

3. Develop an internal web-based application for the generation of notification letters to property owners for annexation hearings, Zoning Board of Adjustment, Planning Board, etc.

4. Develop a web-based application to highlight the historic districts of the City and to allow National Register and Local Historic District data about structures to be searched/browsed online. Make this available to the general public as well as other City departments.

5. Study neighborhood boundaries defined by Police Department to determine feasibility of use by Planning Division for plans at the neighborhood or community level.

6. Utilize US Census data, County tax data, etc. in order to develop a list of potential commercial sites in the City including, but not limited to the Fisher Street and Brooklyn-South Square areas.

7. Utilize US Census data, County tax data, etc. in an effort to establish a plan to recruit commercial, retail, office, and institutional development within the City limits. Develop a web-based application geared toward making this readily available to developers.

8. Develop a zoning case database. Create a web-based application for the research/analysis of zoning cases.

9. Tie a Certificate of Appropriateness database with the Historic District web application to determine where improvements have taken place, during what time, etc. Utilize this information to generate reports for the Historic Commission (currently researched and entered by hand). Have pictures for each property.

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Police

Police – Operations Division

Purpose

To provide 24-hour law enforcement service for the citizens of Salisbury including: protection of life and property, traffic enforcement, investigation of criminal activities. To provide 24-hour law enforcement service for the citizens of Salisbury for investigation of criminal activities.

GIS Uses

The Salisbury Police Department relies heavily on GIS software and data layers. GIS is essential to many aspects of day-to-day operations, including crime analysis, operations and support services.

The Crime Analyst utilizes GIS to pin map crime locations and calls for service. This allows department personnel the opportunity to visualize crime hot spots and repeat locations of calls for service. GIS is also utilized to measure the effectiveness of directed patrol operations.

GIS data layers are incorporated into the departments Computer Aided Dispatch and Records Management System. This allows all department personnel the opportunity to research, analyze, and create reports based on specific geographic locations.

As additional data layers are developed, the department will be able to use GIS in many more ways. Specifically, building footprints will allow officers to visualize building layouts in the event of a critical incident. Street light locations and their illumination will allow for analysis to determine if there is a correlation between poorly lit areas and high incidences of crime. A new

street centerline file is needed in order to consistently have updated information from all City departments.

Additionally, the department has a vision of giving our citizens the ability to map crime from the internet.

Data Development

The following data layers have been identified as necessary for use by the Operations Division of the Police Department:

Layer Name	Use	Status
ATM machines	Reference	Not started
Banks	Reference	Not started
Bus shelters/stops	Indicate location of bus shelters and bus stops	Not started
Churches	Reference	Not started
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Critical care centers	Indicate locations of hospitals, nursing homes, other healthcare facilities; reference	Not started
Drug-free zones	Calculate from school property boundaries	Not started
Institutions	Reference	Complete (in CAD)
Neighborhoods	Use for reporting purposes; reference	Complete
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Parks	Reference	Complete
Schools	Indicate locations of schools (K-12), colleges, and universities	Complete (in CAD)

Street lights (City)	Indicate locations and other attributes of street lights	Currently maintained in CAD; should be converted to ArcInfo
Street lights (Duke Power)	Indicate locations and other attributes of street lights	Obtained from Duke Power in February 2001
Streets	Address matching; reference	Currently use County file; see Engineering for City file status
Subdivisions	Reference	Not started

Goals

1. Develop data layers as identified in the **Data Development** section.

2. Utilize neighborhood data layer developed by Police Department for "Community-Oriented Policing" strategy.

3. Utilize street light data available from Street Lighting/Engineering to determine if there is a correlation between poorly lit areas and increased crime activities. Identify problem areas and utilize data to obtain grants.

4. Utilize drug-free school zones data layer for enhanced penalties for drug-trafficking near schools.

5. Develop weekly/monthly/quarterly/yearly "pin maps" of crimes for ad hoc analysis or analysis by reporting area, neighborhood, beat, or district.

6. Develop a web-based application available to all police personnel for ad hoc analysis of crime data.

7. Develop a scaled-down web-based application available to the public so that they can be better informed about crime within the City of Salisbury.

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Public Services
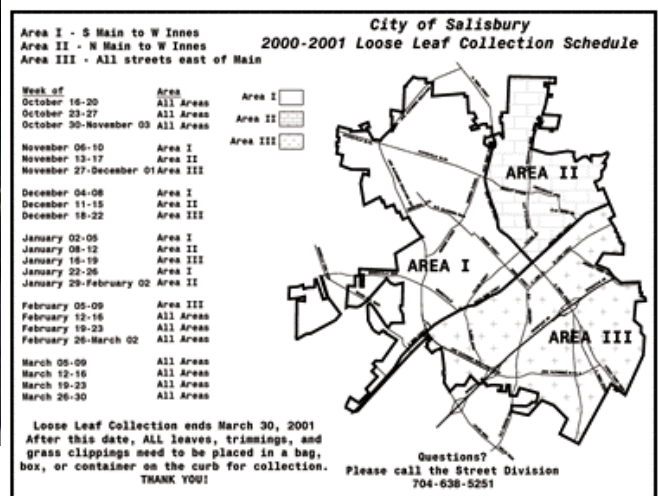
Public Services – Cemetery Division

Purpose

To operate, maintain and develop seven municipal cemeteries totaling 78.6 acres of publicly controlled burial grounds.

GIS Uses

Currently, the Cemetery Division of the Public Services Department does not use GIS. However, the benefits of developing GIS data layers for the Cemetery Division are easily able to be identified. Once developed, these data layers could be used in a number of ways:

1. Maps could be maintained that indicate the location of cemeteries, who owns grave plots and/or who is buried there. Three of the seven cemeteries are still in operation.

2. Records of names, burial dates, etc. could be made available to the general public for the purposes of genealogical research.

Data Development

The following data layers have been identified as necessary for use by the Cemetery Division:

Layer Name	Use	Status
Cemeteries	Indicate locations of cemeteries	Not started
City ETJ boundary	Identify properties within City ETJ	Complete
City limit boundary	Reference	Complete
Grave plots	Indicate locations and other pertinent information about grave plots	Currently maintained in tabular database; no spatial component started
Streets	Reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Utilize data layers to create maps and to coordinate schedules for mowing, weedeating, leaf collection, and the opening and closing of graves.

3. Develop web-based application for the identification of cemeteries and grave plots available to the general public for genealogical research.

Public Services – Landscape Operations Division

Purpose

To provide a centralized resource for implementation of the management and development of City owned landscapes and urban forest resources. To provide staff support to the Salisbury Tree Board; provide management of vegetation on City properties and rights-of-way; and insure compliance with community standards regarding vegetative nuisances, unsanitary conditions and junked or abandoned vehicles on private property.

GIS Uses

Currently, the Landscape Operations Division of the Public Services Department does not use GIS. However, this division has long had a goal of tracking information regarding the location and history of trees planted within the City. Although tracking of location has been achieved on paper, the current system can be hard to access and hard to visualize. A mapping system through GIS could provide a better idea about problem areas, track tree histories, and show new areas for potential plantings.

Data Development

The following data layers have been identified as necessary for use by the Landscape

Operations Division:

Layer Name	Use	Status
City ETJ boundary	Identify properties within City ETJ	Complete
City limit boundary	Reference	Complete
Streets	Reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Tree locations	Identify locations and other pertinent information about trees planted by the division	Currently on paper; no spatial component started

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Utilize data layers to create maps that illustrate tree accomplishments.

3. Develop web-based application for the identification of trees planted in honor, memory,

etc. available to the general public.

Public Services – Street Division

Purpose

To plan, implement and manage the construction and maintenance of all City streets, sidewalks, drainage system and rights-of-way through a program of maintenance, construction, cleaning, and general beautification. To fund activities associated with street construction, maintenance, cleaning and rights-of-way maintenance as provided for by revenue received from the State of North Carolina through the Powell Bill Fund.

GIS Uses

The Street Division currently uses GIS to develop maps for loose leaf collection. The Street Division could benefit further from GIS with the creation of additional data layers – specifically, pavement conditions, sidewalks, and storm drains. GIS could provide a better idea about problem areas and track maintenance histories for streets, sidewalks, and storm drains. Also, GIS could be used to identify areas where new infrastructure may be necessary.

Data Development

The following data layers have been identified as necessary for use by the Street Division:

Layer Name	Use	Status
City ETJ boundary	Identify properties within City ETJ	Complete
City limit boundary	Reference	Complete
Pavement conditions	Identify pavement conditions within City limits	Not started; paper listing available
Sidewalks	Identify location of sidewalks within City limits	Not started
Storm drains	Identify locations of storm drains within City limits	Complete (in CAD); digitized from paper map
Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Devise a routine maintenance schedule of storm drains and track when last maintenance occurred.

3. Develop a street improvements database for yearly submission of information.

Public Services – Traffic Operations Division

Purpose

To provide the City with a resource capable of effectively monitoring and evaluating municipal traffic safety, traffic flow, and parking needs; then develop and implement programs designed to address those needs through a network of traffic signals, traffic control signs, pavement markings and parking control devices.

The group is also responsible for the installation and maintenance of a telecommunications system through the organization (excluding Public Safety telecommunications equipment).

GIS Uses

Currently, the Traffic Operations Division of the Public Services Department does not use GIS. However, this division has a goal of creating/maintaining an inventory of signs, signals, and markings. This would replace the current card filing system, and allow for backup of this information, as well as analysis. This information, once in digital format, could also be shared throughout the City.

Data Development

The following data layers have been identified as necessary for use by the Traffic Operations

Division:

Layer Name	Use	Status
City ETJ boundary	Identify properties within City ETJ	Complete
City limit boundary	Reference	Complete
Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Traffic sign and pole inventory/database	Replace existing manual card system for maintenance, etc. of signs	Not started

Goals

1. Develop data layers as identified in the ***Data Development*** section.

2. Create a traffic sign and pole database to replace existing card-based manual system.
    Work closely with staff so that the issue of maintaining the database is clearly understood
    and able to be implemented.

3. Maintain a comprehensive history on signs and poles in database.

4. Develop internal web browser interface for day-to-day activities, such as adding a sign,
    removing a sign, replacing old signs, replacing stolen/damaged signs, etc.

5. Provide access to this data to all interested City staff.

Public Services – Transit Division

Purpose

To provide funding for the City's share of the City Transit System.

GIS Uses

At present the Transit Division of Public Services does not utilize GIS. However, the benefits of developing GIS data layers for transit are easily able to be identified. Once developed, these data layers could be used in a number of ways:

1. Maps could be maintained that indicate the location of bus routes, bus shelters, and bus stops. These static maps could be made available for download to the general public.

2. Analysis could be run on the location of existing routes to determine what portion of the City was being serviced by the transit system. This information could then be used to plan additional routes and/or changes to existing routes to better serve the public.

3. A web browser interface could be developed for use by the general public for querying of bus routes via time of day, destination, or proximity to an address input by the user.

Data Development

The following data layers have been identified as necessary for use by the Transit Division:

Layer Name	Use	Status
Bus routes	Indicate location of routes	Not started
Bus shelters/stops	Indicate location of bus shelters and bus stops	Not started
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Historic district boundaries	Reference	Complete
Institutions	Reference	Complete (in CAD)
Local landmarks	Reference	Not started
Parcels	Reference	County in process of acquiring data from vendor, ASI
Parks	Reference	Complete
Shopping centers	Reference	Not started
Streets	Address matching	Currently use County file; see Engineering for City file status
Subdivisions	Reference	Not started

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Develop web-based application for the identification of bus routes, bus shelters, and bus stops available to the general public as well as other City departments.

Public Services – Waste Management Division

Purpose

To maintain a clean, healthy environment for the citizens of Salisbury through the regular collection, transportation, and disposition of industrial, commercial and residential refuse, and other debris using an effective, efficient system of waste management and recycling.

GIS Uses

Currently, the Waste Management Division of the Public Services Department uses GIS for the creation of maps to indicate leaf and garbage collection and snow removal areas. GIS could be used further within this department for tracking information regarding citations given to offenders of the roll-cart ordinance. Although tracking of location has been achieved on paper, the current system can be hard to access and hard to visualize. A mapping system through GIS could provide a better idea about problem areas.

Data Development

The following data layers have been identified as necessary for use by the Waste Management

Division:

Layer Name	Use	Status
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Garbage collection areas	Reference	Currently maintained in CAD
Loose leaf collection areas	Reference	Currently maintained in CAD
Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002

Goals

1. Develop/enhance data layers as identified in the **Data Development** section.

2. Develop web-based application for the data input regarding roll-cart ordinance

offenders. Create custom reports.

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Street Lighting

Purpose

To provide for the lighting of the City's streets.

GIS Uses

Currently, the locations of street lights installed by Duke Power on behalf of the City of Salisbury are maintained by the Engineering Division of the Land Management & Development Department. Data for additional street light locations and attributes have been obtained from Duke Power in the past. The process of obtaining data from Duke Power has proven to be difficult, so it will be important for the City to maintain accurate and detailed information.

The locations of street lights are useful not only for Land Management and Development staff, but also for the Police Department. The City crime analyst is interested in utilizing this information to determine if there is a correlation between poorly lit areas within the City and increased levels of criminal activity.

Data Development

The following data layers have been identified as necessary for use by Street Lighting:

Layer Name	Use	Status
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Street lights (City)	Indicate locations and other attributes of street lights	Currently maintained in CAD; should be converted to ArcInfo
Street lights (Duke Power)	Indicate locations and other attributes of street lights	Obtained from Duke Power in February 2001
Streets	Reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002

Goals

1. Work with GIS Coordinator to determine when street light data will be converted to ArcInfo format.

- Identify other attribute data needed by other City departments

- Easily share data and updates with other City departments

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Telecommunications

Purpose

To manage, coordinate and monitor the City's telecommunications system in the areas of telephone, radio, 9-1-1, cable, emergency services communications, and to specify, recommend, and implement solutions to the City's communications needs.

GIS Uses

Currently, Telecommunications utilizes GIS in the evaluation of new and existing communication tower sites. The elevations of existing and/or proposed towers are utilized to prepare coverage area maps. Telecommunications could further benefit from GIS as an inventory of cable and fiber installed by City staff is prepared.

Data Development

The following data layers have been identified as necessary for use by Telecommunications:

Layer Name	Use	Status
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Streets	Reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Telecommunications	Cable and fiber installed by City staff	Not started
Tower Sites	City and commercial communications tower locations	Currently maintained in CAD

Goals

1.   Develop data layers as identified in the *Data Development* section.

Utilities – Engineering Division
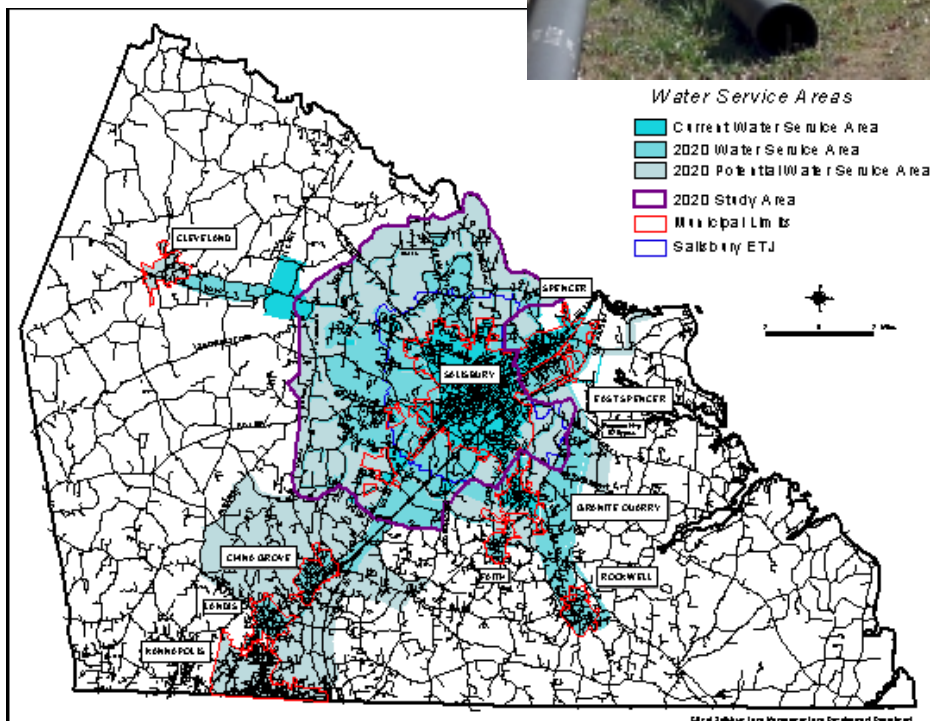
Purpose

Provide consulting engineering and construction management services to other Divisions, utility customers, developers and the public, as needed. Enforce and maintain utility construction standards to protect the well-being of City of Salisbury utility customers. To reduce departmental design costs, decrease construction costs of utility projects, and improve the overall effectiveness of utility designs. To provide accurate design documents, cost analyses, and feasibility studies.

GIS Uses

The Engineering Division of the Utilities Department serves as the primary contact for GIS information regarding the City water and sewer systems. At present, information that is available is maintained in AutoCAD. Plans exist to obtain a complete water and sewer inventory, with cost and personnel (for continuing maintenance) as the limiting factors.

The Engineering Division uses GIS to produce a number of thematic maps for use within the Utilities Department, as well as custom mapping for other city departments, local agencies, and individuals. As the technology base increases, we can continue to expand this mapping element to be easily available to the public through the internet.

As additional data layers are developed, it will become easier to identify areas that could be serviced by Salisbury water and sewer. Parcel level data, coupled with a complete water and sewer inventory, will improve many processes, including hydraulic modeling, new construction of water and sewer lines, and maintenance of existing infrastructure.

Data Development

The following data layers have been identified as necessary for use by the Engineering Division of the Utilities Department:

Layer Name	Use	Status
City ETJ boundary	Reference	Complete
City limit boundary	Reference	Complete
Fire hydrants	Indicate location and other pertinent attributes about hydrants	Not started
Grease traps	Indicate location of grease traps	Not started
Manholes	Indicate location of manholes	Not started
Meters	Indicate location of meters	Not started
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Pump stations	Indicate location of pump stations	Not started
Sewer lines	Indicate location of sewer service lines; reference	Not started
Sewer service areas	Indicate broad areas where sewer service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)
Significant Industrial Users (SIUs)	Indicate location of significant industrial water users	Not started
Storm drains	Identify locations of storm drains within City limits	Complete (in CAD); digitized from paper map
Streets	Address matching; reference	Currently maintained in CAD; anticipate moving to ArcInfo in early 2002
Water lines	Indicate location of water service lines; reference	Not started
Water line valves	Indicate location of water line valves	Not started
Water mains	Indicate location of water mains	Not started

Water service areas	Indicate broad areas where water service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)
Water tanks	Indicate location of water tanks	Maintained as part of Tower Sites (in CAD)
Well sites	Indicate location of well sites	Not started

Goals

1. Develop data layers as identified in the *Data Development* section.

2. Utilize GIS water and sewer line inventories for hydraulic modeling.

3. Obtain new orthophotography to assist in water and sewer extension plans.

4. Obtain new topographic information for Granite Quarry, Rockwell, and other areas serviced by City Utilities that are actually located in the County.

5. Plan the construction of water and sewer lines along growth corridors toward target growth areas identified by Planning and Community Development staff.

6. Utilize GIS water and sewer inventory to establish a prioritization system for capital improvement projects for water and sewer recommendations.

7. Develop a web-based based application to illustrate the location of water and sewer availability in and around the City of Salisbury. Make this available to the general public as well as other City departments.

Goals Summary

Development Services Division

1. Develop data layers as identified in the **Data Development** section.
   - Addresses
   - Redevelopment areas
   - Signs
   - Subdivisions
   - Townships

2. Maintain an accurate database/data layer of addresses by tax map and parcel number for address assignments by the City.

3. Revise existing database(s) for zoning permits in order to...
   - Provide a web-based application for data input/permit printing
   - Standardize addresses for geocoding
   - Generate monthly *Report of Private Building Permits Issued* as required by the North Carolina Department of Labor

4. Geocode zoning permit data in order to provide data quickly and easily through web-based application.

Engineering Division

5. Work with GIS Coordinator to determine when street centerline will be converted to ArcInfo format.
   - Identify other attribute data needed by other City departments
   - Easily share data and updates with County and other City departments
   - Complete block ranges for City streets

6. Develop data layers as identified in the **Data Development** section.
   - Impervious surfaces
   - Parking areas
   - Pedestrian access
   - Subdivisions

7. Develop a web-based application for the identification of flood prone areas available to the general public as well as other City departments.

8. Develop pedestrian access data layer(s) to include locations of sidewalks, pedestrian crosswalks, etc. Determine precision level prior to development of data to see if this information may also be used for impervious surface calculations.

9. Develop impervious surface data layer(s) for storm water runoff analysis purposes. May be able to utilize this information for an assessed impervious surface fee.

10. Aid in development of subdivision data layer.

Fire Department

11. Develop data layers as identified in the *Data Development* section.
    - Abandoned structures
    - Alternate water sources
    - Building plans (commercial structures)
    - Fire hydrants
    - Fire incidents
    - Hazardous materials
    - Land use history
    - Minimum housing structures
    - Photos of structures

12. Utilize street centerline, fire station locations, etc. to determine response times for fire stations by distance as well as by time. Further use this information for planning for increased staffing and/or new fire stations.

13. Purchase software or develop an application that enables Fire Department officials to print on demand City street atlas books for use in vehicles.

14. Develop a web-based application available to all fire personnel for ad hoc analysis of fire data.

15. Develop a scaled-down web-based application available to the public so that they can be better informed about fire incidents within the City of Salisbury.

Parks & Recreation Department

16. Develop data layers as identified in the *Data Development* section.
    - Bicycle routes
    - Local landmarks
    - Private recreation sites
    - Schools

17. Enhanced existing web-based application (parks and facilities inventory) available to the public for querying of amenities via park name, proximity to an address input by user, or type of amenity.

18. Tie existing web-based application (parks and facilities inventory) to programs offered. Make this available to the public for querying of programs via park name, proximity to an address input by user, or type of program.

19. Utilize demographic information, tax data, etc. in an effort to investigate options for building a new gymnasium and planning other future facilities.

20. Develop a web-based application focused specifically on the development of the Salisbury Greenway in order to raise awareness of the project and attract additional funding. Provide photos and other interesting items about the greenway and its amenities.

21. Develop a database of Parks and Recreation customers. Map these customers to determine where customers are coming from and what neighborhoods, communities, etc. are being served. Compare this information to general City demographics.

22. Utilize GIS data for updates to the Parks and Recreation Master Plan: census data, facilities locations, greenways, historical sites, land use, park locations, population projections, private recreation sites, recreation programs, school locations, topological and floodplain data, transportation thoroughfare plan, water and sewer inventories, etc.

Planning

23. Develop data layers as identified in the **Data Development** section.
    - Architectural survey data
    - Building footprints
    - Certificate of appropriateness database
    - Growth corridors/target areas
    - Historic properties database
    - Pedestrian access
    - Subdivisions
    - Zoning case database

24. Develop a web-based application for the querying of zoning information via classification, proximity to an address, and/or tax map and parcel number in put by user. Make this available to the general public as well as other City departments.

25. Develop an internal web-based application for the generation of notification letters to property owners for annexation hearings, Zoning Board of Adjustment, Planning Board, etc.

26. Develop a web-based application to highlight the historic districts of the City and to allow National Register and Local Historic District data about structures to be searched/browsed online. Make this available to the general public as well as other City departments.

27. Study neighborhood boundaries defined by Police Department to determine feasibility of use by Planning Division for plans at the neighborhood or community level.

28. Utilize US Census data, County tax data, etc. in order to develop a list of potential commercial sites in the City including, but not limited to the Fisher Street and Brooklyn-South Square areas.

29. Utilize US Census data, County tax data, etc. in an effort to establish a plan to recruit commercial, retail, office, and institutional development within the City limits. Develop a web-based application geared toward making this readily available to developers.

30. Develop a zoning case database. Create a web-based application for the research/analysis of zoning cases.

31. Tie a Certificate of Appropriateness database with the Historic District web application to determine where improvements have taken place, during what time, etc. Utilize this information to generate reports for the Historic Commission (currently researched and entered by hand). Have pictures for each property.

Police – Operations Division

32. Develop data layers as identified in the *Data Development* section.
    - ATM machines
    - Banks
    - Churches
    - Critical care centers
    - Drug-free zones
    - Schools

33. Utilize neighborhood data layer developed by Police Department for "Community-Oriented Policing" strategy.

34. Utilize street light data available from Street Lighting/Engineering to determine if there is a correlation between poorly lit areas and increased crime activities. Identify problem areas and utilize data to obtain grants.

35. Utilize drug-free school zones data layer for enhanced penalties for drug-trafficking near schools.

36. Develop weekly/monthly/quarterly/yearly "pin maps" of crimes for ad hoc analysis or analysis by reporting area, neighborhood, beat, or district.

37. Develop a web-based application available to all police personnel for ad hoc analysis of crime data.

38. Develop a scaled-down web-based application available to the public so that they can be better informed about crime within the City of Salisbury.

Public Services – Cemetery Division

39. Develop data layers as identified in the *Data Development* section.
    - Cemeteries
    - Grave plots

40. Utilize data layers to create maps and to coordinate schedules for mowing, weedeating, leaf collection, and the opening and closing of graves.

41. Develop web-based application for the identification of cemeteries and grave plots available to the general public for genealogical research.

Public Services – Landscape Operations Division

42. Develop data layers as identified in the *Data Development* section.
    - Tree inventory/database

43. Utilize data layers to create maps that illustrate tree accomplishments.

44. Develop web-based application for the identification of trees planted in honor, memory, etc. available to the general public.

Public Services – Street Division

45. Develop data layers as identified in the *Data Development* section.
    - Pavement conditions
    - Sidewalks
    - Storm drains

46. Devise a routine maintenance schedule of storm drains and track when last maintenance occurred.

47. Develop a street improvements database for yearly submission of information.

Public Services – Traffic Operations

48. Develop data layers as identified in the *Data Development* section.
    - Traffic sign and pole inventory/database

49. Create a traffic sign and pole database to replace existing card-based manual system. Work closely with staff so that the issue of maintaining the database is clearly understood and able to be implemented.

50. Maintain a comprehensive history on signs and poles in database.

51. Develop internal web browser interface for day-to-day activities, such as adding a sign, removing a sign, replacing old signs, replacing stolen/damaged signs, etc.

52. Provide access to this data to all interested City staff.

Public Services – Transit

53. Develop data layers as identified in the *Data Development* section.
    - Bus routes
    - Bus shelters/stops
    - Local landmarks
    - Shopping centers

54. Develop web-based application for the identification of bus routes, bus shelters, and bus stops available to the general public as well as other City departments.

Public Services – Waste Management

55. Develop/enhance data layers as identified in the *Data Development* section.
    - Garbage collection areas
    - Loose leaf collection areas **(Street Division responsible for this item.)**

56. Develop web-based application for the data input regarding roll-cart ordinance offenders. Create custom reports. **(Public Services Administration will be responsible for this item.)**

Street Lighting

57. Work with GIS Coordinator to determine when street light data will be converted to ArcInfo format.
    - Identify other attribute data needed by other City departments
    - Easily share data and updates with other City departments

Telecommunications

58. Develop data layers as identified in the Data Development section.
    - Telecommunications
    - Tower sites

Utilities – Engineering Division

59. Develop data layers as identified in the Data Development section.
    - Fire hydrants
    - Grease traps
    - Manholes
    - Meters
    - Pump stations
    - Sewer lines
    - Significant industrial users
    - Storm drains
    - Water lines
    - Water line valves
    - Water mains
    - Water tanks
    - Well sites

60. Utilize GIS water and sewer line inventories for hydraulic modeling.

61. Obtain new orthophotography to assist in water and sewer extension plans.

62. Obtain new topographic information for Granite Quarry, Rockwell, and other areas serviced by City Utilities that are actually located in the County.

63. Plan the construction of water and sewer lines along growth corridors toward target growth areas identified by Planning and Community Development staff.

64. Utilize GIS water and sewer inventory to establish a prioritization system for capital improvement projects for water and sewer recommendations.

65. Develop a web-based based application to illustrate the location of water and sewer availability in and around the City of Salisbury. Make this available to the general public as well as other City departments.

Utilize this table when referring to the "Maintenance" column in the Master Data Layer List.

Number	Corresponding Department/Division
1	Land Management & Development Dept., Development Services Division
2	Land Management & Development Dept., Engineering Division
3	Fire Department
4	Land Management & Development Dept., GIS Division
5	Parks & Recreation Department
6	Land Management & Development Dept., Planning Division
7	Police Department
8	Public Services Department
9	Street Lighting
10	Telecommunications
11	Utilities Department

Master Data Layer List

City Data Layers

Layer Name	Use	Status	Maintenance
Abandoned structures	Indicate locations of abandoned, vacant, or structures not meeting minimum housing codes	Not started	3
Addresses	Tie City-assigned addresses to County tax map and parcel numbers	In progress	1
Alternate water sources	Reference	Not started	3
Annexation areas	Indicate areas slated for annexation	In progress – some areas compiled in CAD	2
Architectural survey data	Reference	Complete in paper form; digital form not started	6
ATM machines	Reference	Not started	7
Banks	Reference	Not started	7
Bicycle routes	Indicate designated bicycle routes	Complete in paper form; digital form not started	4
Billboards	Identify locations of compliant/non-compliant billboards	Complete (in CAD)	2
Building footprints	Reference	Not started	4
Building plans (commercial structures)	Helpful when fighting fires at large/multiple buildings; Reference	Not started	3
Bus routes	Indicate location of routes	Not started	4
Bus shelters/stops	Indicate location of bus shelters and bus stops	Not started	4
Cemeteries	Indicate locations of cemeteries	Not started	4
Certificate of Appropriateness database	Research/analysis/reference	Not started	6
Churches	Reference	Not started	7
City ETJ boundary	Define extent of City's jurisdiction within ETJ	Complete	2
City limit boundary	Define City limit line	Complete	2

Critical care centers	Indicate locations of hospitals, nursing homes, other healthcare facilities; reference	Not started	7
Drug-free zones	Calculate from school property boundaries	Not started	7
Fire hydrants	Indicate location and other pertinent attributes about hydrants	Not started	3
Fire incidents (geocoded)	Research/analysis/reference	Not started	3
Fire station locations	Indicate locations of fire stations	Complete	3
Floodway	Identify properties within flood-prone areas	Complete; digitized from FEMA maps	2
Garbage collection areas	Reference	Currently maintained in CAD	2
Grave plots	Indicate locations and other pertinent information about grave plots	Currently maintained in tabular database; no spatial component started	4
Grease traps	Indicate location of grease traps	Not started	11
Greenway	Indicate location of greenway and illustrate access to parks	Currently maintained in CAD	2
Growth corridors/target areas	Indicate areas desirable for growth/redevelopment by the City	Not started	6
Hazardous materials	Indicate locations where hazardous materials are stored	Not started	3
Historic district boundaries	Define local and national historic districts	Complete	6
Historic properties database	Research/analysis/reference	Started by intern in Spring 2001; need new intern	6
Impervious surfaces	Include locations of sidewalks, parking areas, etc.	Not started	2
Inspected City businesses	Indicate locations of inspected City businesses; reference	Currently maintained in FireInfo by Doug Stevens	3
Institutions	Reference	Complete (in CAD)	2
Land use	Indicate classifications of land use on a parcel level basis	Completed as a part of 2020 Plan; requires updating.	6

Land use history	Indicate previous uses of land use on a parcel level basis	Not started	3
Local landmarks	Reference	Not started	4
Loose leaf collection areas	Reference	Currently maintained in CAD	2
Manholes	Indicate location of manholes	Not started	11
Meters	Indicate location of meters	Not started	11
Minimum housing structures	Structures not meeting minimum housing standards; reference	Not started	3
Neighborhoods	Indicate locations by common names; reference	Complete (developed by Planning)	6
Neighborhoods	Use for reporting purposes; reference	Complete (developed by Police)	7
OPTICOM intersections	Reference	Complete (in CAD)	2
Orthophotography	Reference	Current photos date to 1983; new flight scheduled winter of 2001-2002	4
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI	4
Parking areas	Indicate location and type of parking areas	Not started	2
Parks	Indicate location of parks and recreation areas	Complete	2, 4
Pavement conditions	Identify pavement conditions within City limits	Not started; paper listing available	8
Pedestrian access	Include locations of sidewalks, pedestrian crosswalks, etc.	Not started	2
Photos of structures	Reference	Not started	3
Private recreation sites	Reference	Not started	2, 4
Pump stations	Indicate location of pump stations	Not started	11
Redevelopment Areas	Identify properties within targeted redevelopment areas	Not started	6
Schools	Indicate locations of schools (K-12), colleges, and universities	Complete (in CAD)	2, 7
Sewer lines	Indicate location of sewer service lines; reference	Not started	11

Sewer service areas	Indicate broad areas where sewer service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)	11
Shopping centers	Reference	Not started	4
Sidewalks	Identify location of sidewalks within City limits	Not started	2
Significant Industrial Users (SIUs)	Indicate location of significant industrial water users	Not started	11
Signs	Identify locations of compliant/non-compliant signs, complete with pictures	Not started	1
Storm drains	Identify locations of storm drains within City limits	Complete (in CAD); digitized from paper map	2
Street lights (City)	Indicate locations and other attributes of street lights	Currently maintained in CAD; should be converted to ArcInfo	2, 9
Street lights (Duke Power)	Indicate locations and other attributes of street lights	Obtained from Duke Power in February 2001	9
Streets	Address matching	Currently use County file; see Engineering for City file status	2
Subdivisions	Indicate location of named subdivisions	Not started	2, 4
Telecommunications	Cable and fiber installed by City staff	Not started	4, 10
Topography	Planning purposes; reference (2 ft contours)	Complete (based on 1987 flight)	2
Tower Sites	City and commercial communications tower locations	Currently maintained in CAD	2
Townships	Identify properties according to township location; reference	Not started	4
Traffic sign and pole inventory/database	Replace existing manual card system for maintenance, etc. of signs	Not started	8
Traffic volumes	Indicate volume of traffic at certain points along City streets	Currently received from NCDOT in paper format	2
Tree locations	Identify locations and other pertinent information about trees planted by the division	Currently on paper; no spatial component started	8

US Census Data	Data from Summary Tape Files 1 and 3.	STF1 not processed; STF3 not yet available	4
Water lines	Indicate location of water service lines; reference	Not started	11
Water line valves	Indicate location of water line valves	Not started	11
Water mains	Indicate location of water mains	Not started	11
Water service areas	Indicate broad areas where water service is available or anticipated to be available; reference	Complete (Salisbury 2020 Plan)	11
Water tanks	Indicate location of water tanks	Maintained as part of Tower Sites (in CAD)	2, 11
Well sites	Indicate location of well sites	Not started	11
Zoning	Identify zoning boundaries	Complete	6
Zoning case database	Research/analysis/reference	Not started	6

County Data Layers

Layer Name	Use	Status
County boundary	Reference	Complete
Fire and rescue station locations	Indicate locations of fire and rescue stations	Complete
Fire districts	Reference	Not yet acquired
Hydrology	Reference	Complete
Index grid	Index grid for orthophotography	Complete
Municipal boundaries	Reference	Complete
Municipal ETJ boundaries	Reference	Complete
Parcels	Tax map and parcel number matching; reference	County in process of acquiring data from vendor, ASI
Schools	Indicate locations of schools	Complete
School districts	Reference	Complete
Streets	Address matching	County in process of acquiring updated data from vendor, ASI
Voting precincts	Reference	Complete
Zoning	Identify zoning boundaries	Complete